Los Alamos
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memorandum
LANSCE Division
Group LANSCE−1

To/MS: Distribution
From/MS: Frank Krawczyk
Phone/FAX: 7−1958/5−2904
Symbol: LANSCE−1:01−014
Date:2/5/01
E−mail: fkrawczyk@lanl.gov

Subject: Peak Surface Field Locations in the ANL Cavity

During the test of the ANL cavity we plan to put temperature and x−ray sensors onto the ANL cavity at the locations of highest electric field and highest local RF loss. These locations are all on the spoke body. Here the locations, as derived from MAFIA simulations are specified

Peak RF Losses

Figure 1 shows the RF−losses on the spoke in the vicinity of the spoke base, where the spoke joins the outer cavity wall. The positions of the overall highest RF loss, as well as a local maximum are indicated. The two red lines correspond lines along which the relative losses are plotted in Figure 2.

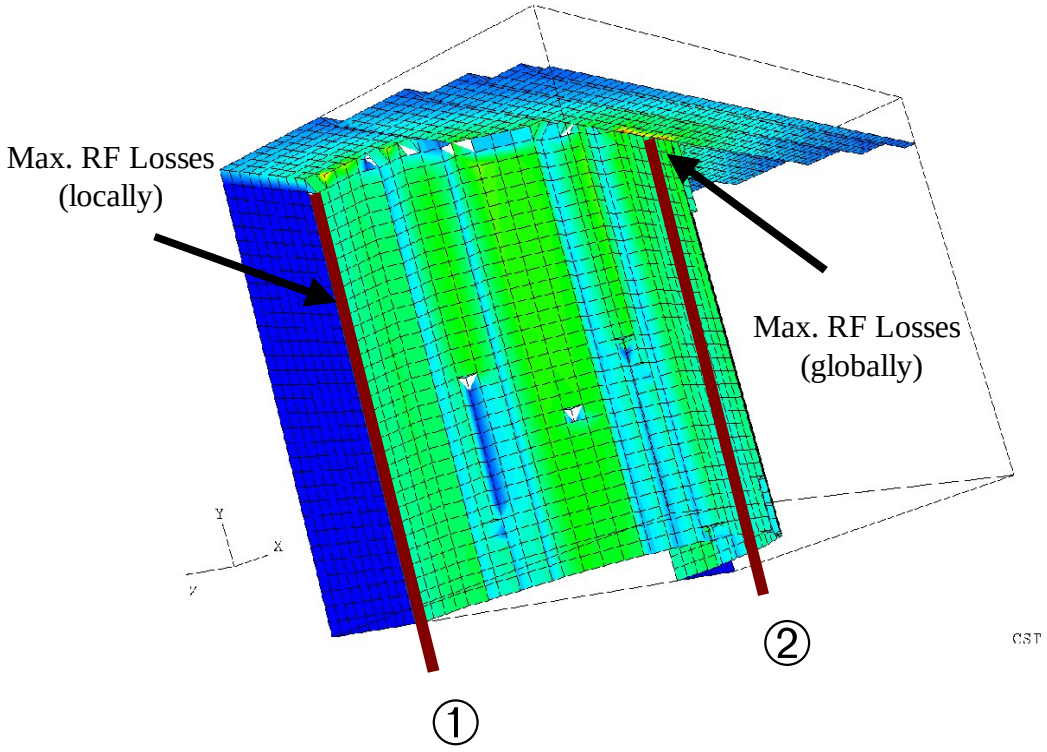

Figure 1: This is a 3D display of the local RF losses at the spoke base. The next figure gives the loss distribution along paths ① and ②.

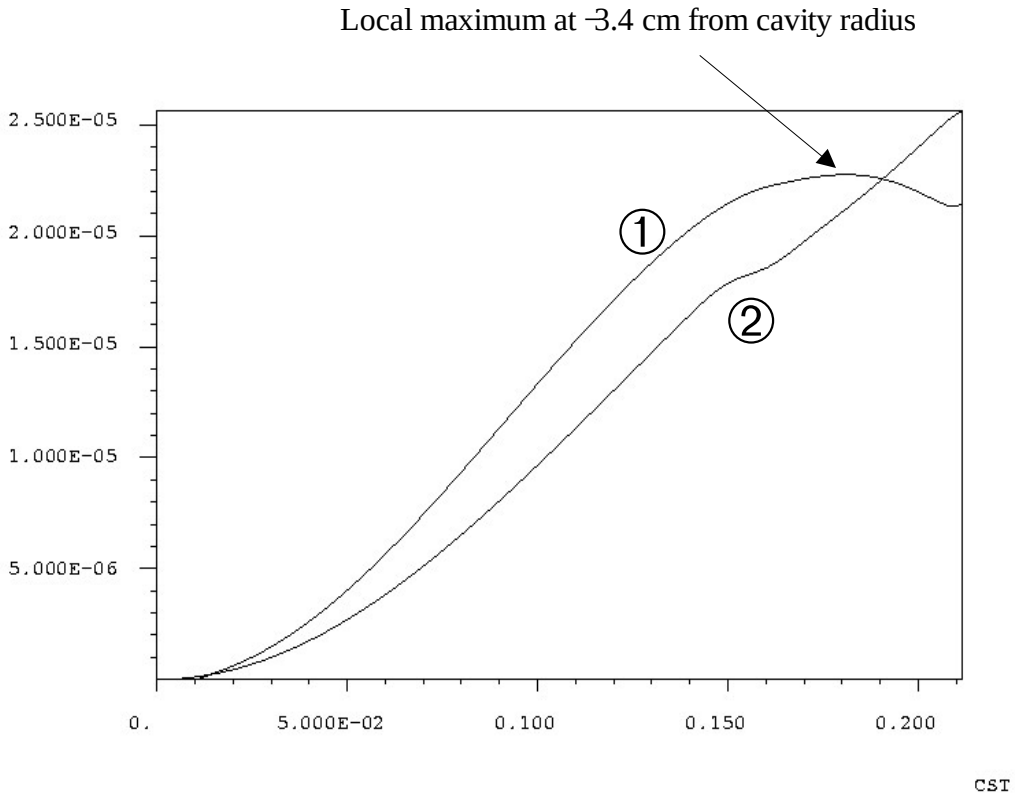

Figure 2: The RF losses along the two paths that are indicated in the previous figure. The maximum along path ① (on the spoke base away from the beam axis) is 3.4 cm below the cavity radius. The global maximum is on the spoke base in a plane through the beam axis, right where the spoke joins the outer cavity wall.

Each of these locations exists 4 times on the spoke; the maximum of path① ±90 degrees off the beam line at the top and the bottom of the spoke; the maximum of path ② also exists twice on the bottom and the top of the spoke.

Peak Electric Fields

Figure 3 shows the electric field amplitude on the surface of the spoke. The highest values are found around the aperture of the spoke. There are 10 locations with peaks in the electric surface field. Two local maxima exist in the middle plane of the spoke (on path ②, 90 degrees away from the beam line. The global maximum is reached eight times around the beam aperture hole of the spoke.

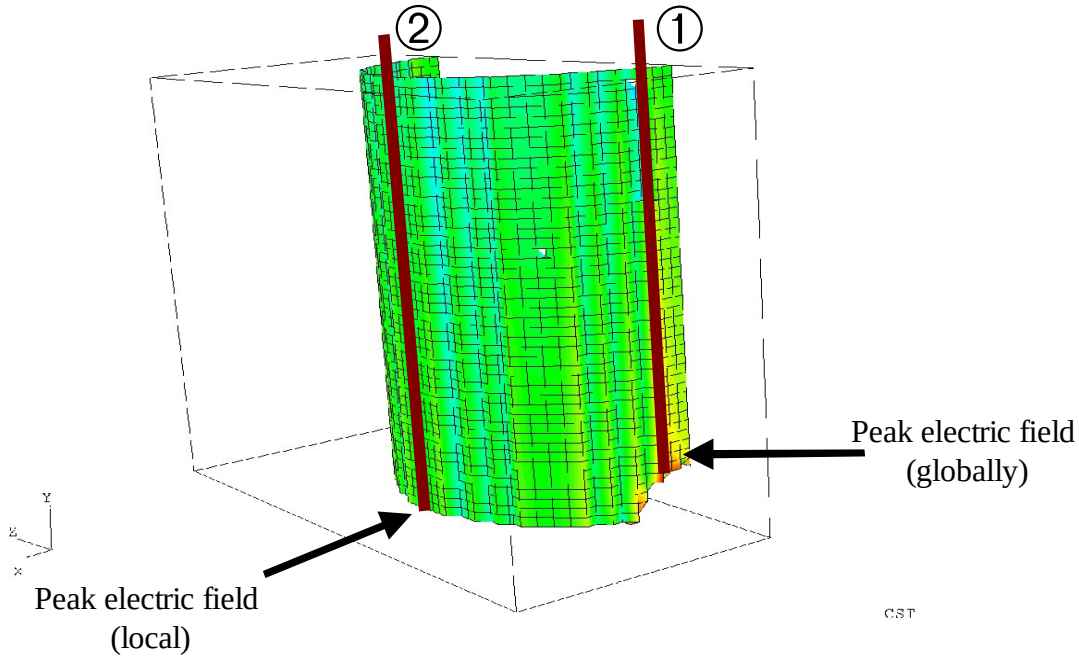

Figure 3: The highest peak electric fields are reached around the aperture of the spoke. The red lines indicate the paths along which the field levels are compared in the following figure.

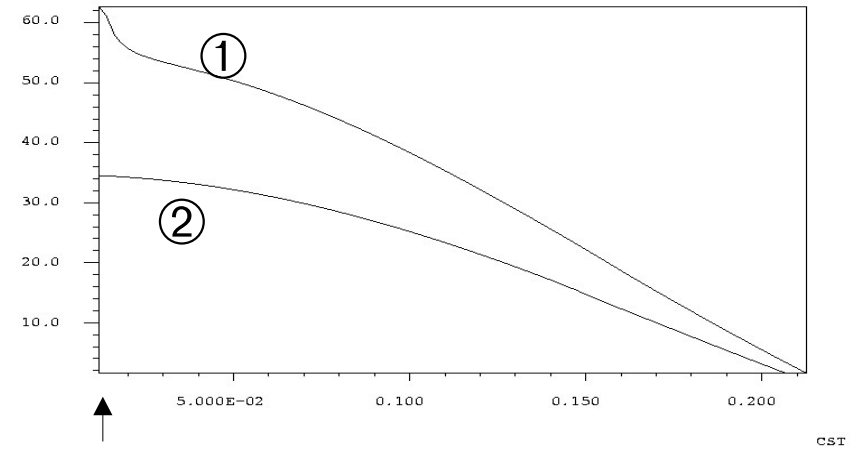

Figure 4: The electric peak surface fields are compared for the two paths indicated in the previous figure. The global maximum is reached on path ①, close to the beam aperture hole in the spoke.

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